Citation:

Ruidavets JB, Bongard V, Dallongeville J, Arveiler D, Ducimetière P, Perret B, Simon C, Amouyel P, Ferrières J. High consumptions of grain, fish, dairy products and combinations of these are associated with a low prevalence of metabolic syndrome. *J Epidemiol Community Health.* 2007 Sep;61(9):810-7.

PubMed ID: 17699537

Study Design:

Cross-sectional Study

Class:

D - Click here for explanation of classification scheme.

Research Design and Implementation Rating:

NEUTRAL: See Research Design and Implementation Criteria Checklist below.

Research Purpose:

To analyze the relation between various food groups and the frequency of insulin resistance syndrome (IRS).

Inclusion Criteria:

- Male
- 45 to 64 years
- Recruited from Lille, Strasbourg, and Toulouse

Exclusion Criteria:

- Subjects with incomplete data

Description of Study Protocol:

Recruitment Men living in three regions—Lille (northern France), Strasbourg (north-eastern France), and Toulouse (southwestern France) were randomly recruited between 1995 and 1997 as part of the French MONICA Study by using polling lists (nominal lists for French inhabitants aged over 18 years) available in each of the three town halls.

Design:

A population-based survey was given to each subject from one of the three French MONICA centres.

Blinding used: Not described

Intervention: Not applicable

Statistical Analysis

- Data were analyzed according to quintiles of food groups and medians of dairy products, fish or cereal grains
- Multivariate logistic regression was undertaken to test the independent statistical association of IRS with quintiles of food group intakes and with the various combinations of dairy products, grain, and fish variables

Data Collection Summary:

Timing of Measurements

One time survey/physical assessment.

Dependent Variables

- Height, weight, waist circumference
- Blood pressure
- Plasma glucose
- Triglycerides
- Total cholesterol
- High density lipoprotein (HDL) cholesterol
- Low density lipoprotein (LDL) cholesterol was calculated

Independent Variables

- Consumption of dairy products, fish, or cereal grains assessed through three consecutive day food diary

Control Variables

- Centre
- Age
- Physical activity
- Education
- Smoking
- Dieting
- Alcohol intake
- Treatments for hypertension and dyslipidemia
- Energy intake
- Diet quality index

Description of Actual Data Sample:

Initial N: 976 males, 0 females

Attrition (final N): 912 males, 0 females

Age:45 to 64 years with a standard deviation of 6.1 years; average 55.1

Other relevant demographics:

Centre:
Lille 38.7%
Strasbourg 25.1%
Toulouse 36.2%

Living area:
Rural 16.5%
Semi-urban 46.7%
Urban 36.8%

Years of schooling 11.6 (3.8)

Occupational activity:
Blue collar 45.4%
Intermediate 28.0%
White collar 26.6%
Physical activity (%)* 33.2
Current cigarette smoker 21.2%

Drugs for:
Hypertension 20.4%
Dyslipidaemia 16.3%
Diabetes 5.2%
Dieting 23.4%
Alcohol consumption (g/d) 33.6 (30.9)

Systolic blood pressure (mm Hg) 139.4 (19.2)
Diastolic blood pressure (mm Hg) 86.2 (11.7)
Heart rate (beats/min) 67.9 (10.1)
Blood glucose (mmol/l) 5.78 (1.30)
Total cholesterol (mmol/l) 5.98 (1.01)
High density lipoprotein (mmol/l) 1.33 (0.38)
Low density lipoprotein (mmol/l) 4.02 (0.95)
Triglycerides (mmol/l) 1.38 (0.75)

High blood pressure (%) 75.8
High waist girth (%) 29.5
High blood glucose (%) 21.5
High triglycerides (%) 24.0
Low HDLc (%) 21.9

Anthropometrics

Insulin resistance syndrome 23.5%

Body mass index (kg/m^2) 27.2 (4.0)
Waist circumference (mm) 972 (109)
Waist to hip ratio 0.96 (0.06)

Location: France

Summary of Results:

Key Findings

- **The prevalence of IRS was 23.5%, and it reached 29.0%, 28.1% and 28.1% when the intake was below the median for fish, dairy products and grain, respectively.**
- **When consumption of all three types of food were higher than the median, the prevalence reached 13.1%, and when they were lower, the prevalence was 37.9% (P < 0.001).**
- **In logistic regression adjusted for confounders, the odds ratio for IRS (above median value versus below) were 0.51 (95% CI: 0.36 to 0.71) for fish, 0.67 (95% Cl: 0.47 to 0.94) for dairy products, and 0.69 (0.47 to 1.01) for grain.**
- **When intakes of all three kinds of food were high, the odds ratio was 0.22 (95% CI: 0.10 to 0.44), pValue = 0.0001.**

Author Conclusion:

Our study shows that patterns characterized by a high consumption of dairy products, fish, or grain are associated with a lower probability of presenting with an IRS. The combination of these food intakes tends to be more favourable than the consumption of each food type separately, and dramatically decreased the risk of having a metabolic syndrome.

Reviewer Comments:

Study participants were not representative of general population; inclusion/exclusion criteria not well described, only men studied.

Research Design and Implementation Criteria Checklist: Primary Research

Relevance Questions		
1.	Would implementing the studied intervention or procedure (if found successful) result in improved outcomes for the patients/clients/population group? (Not Applicable for some epidemiological studies)	Yes
2.	Did the authors study an outcome (dependent variable) or topic that the patients/clients/population group would care about?	Yes
3.	Is the focus of the intervention or procedure (independent variable) or topic of study a common issue of concern to nutrition or dietetics practice?	Yes
4.	Is the intervention or procedure feasible? (NA for some epidemiological studies)	Yes

Validity Questions		
1.	**Was the research question clearly stated?**	Yes
1.1.	Was (were) the specific intervention(s) or procedure(s) [independent variable(s)] identified?	Yes
1.2.	Was (were) the outcome(s) [dependent variable(s)] clearly indicated?	Yes
1.3.	Were the target population and setting specified?	Yes
2.	**Was the selection of study subjects/patients free from bias?**	???
2.1.	Were inclusion/exclusion criteria specified (e.g., risk, point in disease progression, diagnostic or prognosis criteria), and with sufficient detail and without omitting criteria critical to the study?	No
2.2.	Were criteria applied equally to all study groups?	N/A
2.3.	Were health, demographics, and other characteristics of subjects described?	Yes
2.4.	Were the subjects/patients a representative sample of the relevant population?	Yes
3.	**Were study groups comparable?**	N/A
3.1.	Was the method of assigning subjects/patients to groups described and unbiased? (Method of randomization identified if RCT)	N/A
3.2.	Were distribution of disease status, prognostic factors, and other factors (e.g., demographics) similar across study groups at baseline?	N/A
3.3.	Were concurrent controls used? (Concurrent preferred over historical controls.)	N/A
3.4.	If cohort study or cross-sectional study, were groups comparable on important confounding factors and/or were preexisting differences accounted for by using appropriate adjustments in statistical analysis?	N/A
3.5.	If case control or cross-sectional study, were potential confounding factors comparable for cases and controls? (If case series or trial with subjects serving as own control, this criterion is not applicable. Criterion may not be applicable in some cross-sectional studies.)	N/A
3.6.	If diagnostic test, was there an independent blind comparison with an appropriate reference standard (e.g., "gold standard")?	N/A
4.	**Was method of handling withdrawals described?**	Yes
4.1.	Were follow-up methods described and the same for all groups?	Yes

4.2.	Was the number, characteristics of withdrawals (i.e., dropouts, lost to follow up, attrition rate) and/or response rate (cross-sectional studies) described for each group? (Follow up goal for a strong study is 80%.)	Yes
4.3.	Were all enrolled subjects/patients (in the original sample) accounted for?	Yes
4.4.	Were reasons for withdrawals similar across groups?	N/A
4.5.	If diagnostic test, was decision to perform reference test not dependent on results of test under study?	N/A
5.	**Was blinding used to prevent introduction of bias?**	Yes
5.1.	In intervention study, were subjects, clinicians/practitioners, and investigators blinded to treatment group, as appropriate?	N/A
5.2.	Were data collectors blinded for outcomes assessment? (If outcome is measured using an objective test, such as a lab value, this criterion is assumed to be met.)	Yes
5.3.	In cohort study or cross-sectional study, were measurements of outcomes and risk factors blinded?	Yes
5.4.	In case control study, was case definition explicit and case ascertainment not influenced by exposure status?	N/A
5.5.	In diagnostic study, were test results blinded to patient history and other test results?	N/A
6.	**Were intervention/therapeutic regimens/exposure factor or procedure and any comparison(s) described in detail? Were interveningfactors described?**	Yes
6.1.	In RCT or other intervention trial, were protocols described for all regimens studied?	N/A
6.2.	In observational study, were interventions, study settings, and clinicians/provider described?	Yes
6.3.	Was the intensity and duration of the intervention or exposure factor sufficient to produce a meaningful effect?	N/A
6.4.	Was the amount of exposure and, if relevant, subject/patient compliance measured?	N/A
6.5.	Were co-interventions (e.g., ancillary treatments, other therapies) described?	N/A
6.6.	Were extra or unplanned treatments described?	N/A
6.7.	Was the information for 6.4, 6.5, and 6.6 assessed the same way for all groups?	N/A
6.8.	In diagnostic study, were details of test administration and replication sufficient?	N/A
7.	**Were outcomes clearly defined and the measurements valid and reliable?**	Yes

7.1.	Were primary and secondary endpoints described and relevant to the question?	Yes
7.2.	Were nutrition measures appropriate to question and outcomes of concern?	Yes
7.3.	Was the period of follow-up long enough for important outcome(s) to occur?	Yes
7.4.	Were the observations and measurements based on standard, valid, and reliable data collection instruments/tests/procedures?	Yes
7.5.	Was the measurement of effect at an appropriate level of precision?	Yes
7.6.	Were other factors accounted for (measured) that could affect outcomes?	Yes
7.7.	Were the measurements conducted consistently across groups?	N/A
8.	**Was the statistical analysis appropriate for the study design and type of outcome indicators?**	Yes
8.1.	Were statistical analyses adequately described and the results reported appropriately?	Yes
8.2.	Were correct statistical tests used and assumptions of test not violated?	Yes
8.3.	Were statistics reported with levels of significance and/or confidence intervals?	Yes
8.4.	Was "intent to treat" analysis of outcomes done (and as appropriate, was there an analysis of outcomes for those maximally exposed or a dose-response analysis)?	N/A
8.5.	Were adequate adjustments made for effects of confounding factors that might have affected the outcomes (e.g., multivariate analyses)?	Yes
8.6.	Was clinical significance as well as statistical significance reported?	Yes
8.7.	If negative findings, was a power calculation reported to address type 2 error?	N/A
9.	**Are conclusions supported by results with biases and limitations taken into consideration?**	Yes
9.1.	Is there a discussion of findings?	Yes
9.2.	Are biases and study limitations identified and discussed?	Yes
10.	**Is bias due to study's funding or sponsorship unlikely?**	Yes
10.1.	Were sources of funding and investigators' affiliations described?	Yes
10.2.	Was the study free from apparent conflict of interest?	Yes